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Review Article

Let your patients watch and talk during examination: A review of unsedated transnasal endoscopy

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ABSTRACT

The use of unsedated transnasal esophagogastroduodenoscopy (UT-EGD) is a milestone in gastrointestinal endoscopy. Although the image quality, suction, air insufflation, and lens washing in UT-EGD have been reported to be inferior to those in conventional peroral EGD (P-EGD), the former procedure is associated with reduced gag reflex and is better tolerated than the latter. Several large studies have shown that transnasal endoscopy is safe, well tolerated, and less risky than P-EGD, which requires sedation in most western countries. Moreover, UT-EGD induces less sympathetic stimulation and less oxygen desaturation compared with P-EGD. Use of an ultrathin endoscopy, an alternative choice to endoscopic retrograde cholangiography, is helpful in patients with gastrointestinal stenosis and is a convenient method for postpyloric feeding tube placement. However, nasal anesthetic methods, techniques of scope insertion and withdrawal from the delicate nasal cavity, and therapeutic applications may be difficult to learn without proper training, even for an experienced endoscopist.

1. Introduction

Ultrathin endoscopes were initially developed in the 1970s for use in pediatric patients [1]. In 1994, Shaker [2] first reported the use of an ultrathin endoscope to perform unsedated transnasal esophagogastroduodenoscopy (UT-EGD) in adults, a milestone in gastrointestinal endoscopy. UT-EGD has been used extensively in Japan since 2002, when ultrathin videoscopes became available there. Unlike the United States, Canada, and some European countries (such as France, Italy, and The Netherlands) have been using UT-EGD for many years. In the United States, upper endoscopy is performed under sedation to reduce patient discomfort. However, sedation is the main cause of morbidity and mortality during endoscopy. UT-EGD does not require sedation, and there is strong evidence confirming its safety and cost effectiveness [3,4]. Although it is not difficult for an endoscopist competent in peroral EGD (P-EGD) to perform UT-EGD, special techniques in transnasal anesthesia, nasal insertion, and withdrawal of a scope from nasal cavity require specific training. The aim of this review is to update medical/paramedical staff, clinicians, and gastroenterologists on the advantages and disadvantages of UT-EGD.

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2. Technical characteristics

2.1. Transnasal endoscopy room and endoscopes

Transnasal endoscopy can be performed without sedation in a quiet, warm place. A transnasal endoscopy room that was set up in the Buddhist Tzu Chi General Hospital has been modified to help relax unsedated patients (Fig. 1). Unsedated UT-EGD can be applied via either the oral or the transnasal route. Currently there are three brands of transnasal endoscopes with special image features: narrow band imaging (NBI, Olympus Corporation, Tokyo, Japan), formerly "Fujinon intelligent chromo endoscopy", now known as "flexible spectral imaging color enhancement" (FICE, Fujinon Corporation, Tokyo, Japan), and iSCAN (Pentax Corporation, Tokyo, Japan). Characteristics and sizes of these typical transnasal endoscopes are shown in Table 1 and Fig. 2. UT-EGD is suggested as an alternative to P-EGD for some uncooperative patients or those with "endoscophobia."

2.2. Patency test

2.2.1. Sniff test

The sniff test has been applied widely since the report of Shaker in 1994 [2]. The technique is very simple but regarded as a subjective test. For the selection of the more patent nostril, a patient is

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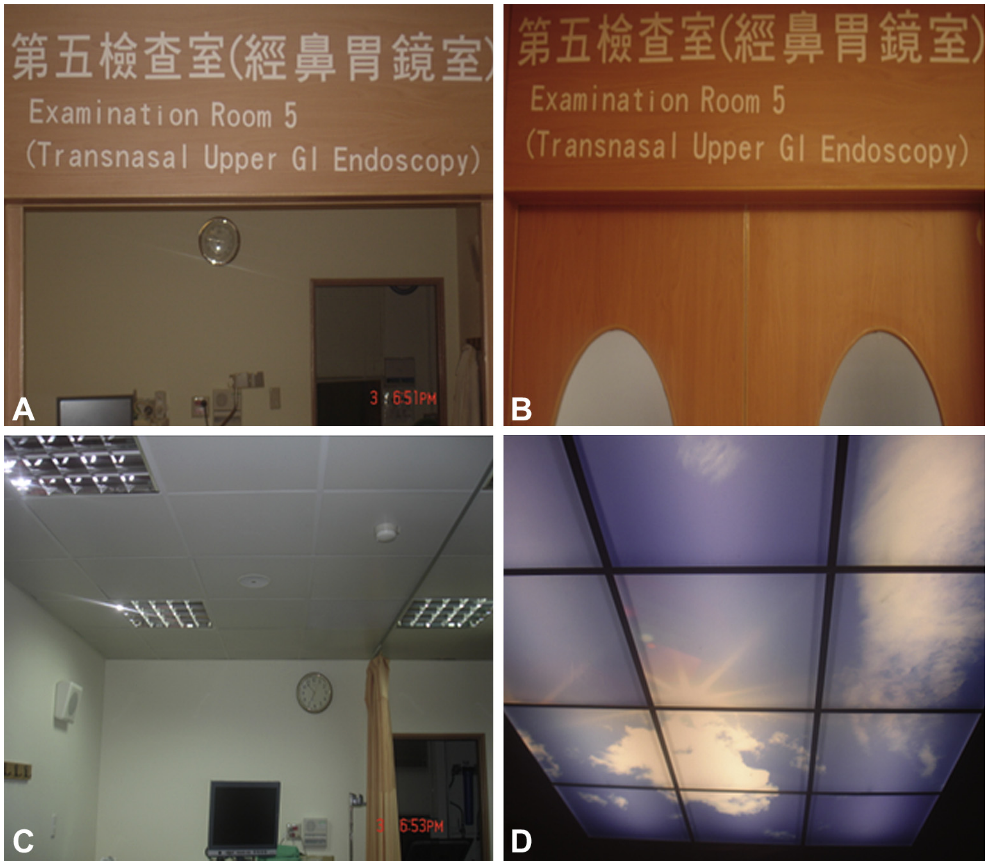

Fig. 1. Design of the transnasal endoscopy room at the Buddhist Tzu Chi General Hospital, Hualien, Taiwan, with a relaxed, warm, welcoming atmosphere. (A) Initial design of the room closed by two sliding door curtains; (B) design modification, considering patient's privacy, with internally controlled electronic doors with welcoming, "Mickey Mouse" windows and warm lighting; (C) initial ceiling design of the room, similar to that of other conventional endoscopy rooms; (D) improvement in the "cold," sterile atmosphere using new ceiling boards exhibiting a blue sky and white clouds, thereby creating a calm environment.

asked to inhale through only one nostril, with the other being sealed by the examiner's index finger; the nostril through which air passes more easily is chosen. A more objective method such as a meatuscopy should be used for selecting the most patent meatus for anesthesia and endoscopic insertion.

2.2.2. Plastic cotton-tipped applicator priming test

As described in our previous study [5], a cotton-tipped applicator priming test helps determine the following: (1) right or left nostril; (2) inferior nasal meatus (INM) or middle nasal meatus (MNM); and (3) the need for epinephrine decongestion. Two sterile, 3 inch × 1/10 inch, plastic cotton-tipped applicators, pretreated with a minimal amount of 2% viscous lidocaine plus 4% liquid lidocaine, can be applied gently in parallel to test for the most patent meatus. Two

Table 1
Representative transnasal endoscopes.

Model	Angulation (degree)	Field of view (degree)	Shaft diameter (mm)	Channel diameter (mm)	Working length (mm)	Special feature
Olympus	Both types:					
GIF-XP180N	210↑/90↓	120	5.5	2	1100	NBI
GIF-XP260N	100←/100→	120	5.5 (5.0)[a]	2	1100	NBI
Fujinon	Both types:					
EG-530N	210↑/90↓	120	5.9	2	1100	FICE
EG-530NW	100←/100→	140	5.9	2	1100	FICE/BL
Pentax	Both types:					
EG 1690K	210↑/120↓	120	5.4	2	1100	iSCAN
EG 1870K	120←/120→	140	6	2	1050	iSCAN

BL = bright light; FICE = flexible spectral imaging color enhancement; NBI = narrow band image; ↑/↓ = up/down angulation; ←/→ = left/right angulation.
[a] A 5.5-mm insertion tube with a 5-mm-diameter distal end.

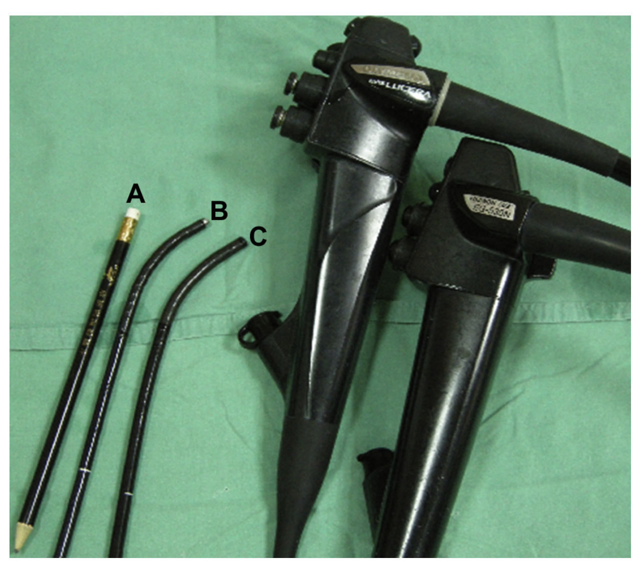

Fig. 2. Two commonly used transnasal endoscopes. Shaft diameters of a (A) pencil, (B) Olympus GIF-XP260N endoscope, and (C) Fujinon EG-530N endoscope are 6 mm, 5.5 mm, and 5.9 mm, respectively. The Olympus endoscope has a tapered distal end (5 mm in diameter, compared with the 5.5-mm-diameter insertion tube).

applicators are inserted parallel to the nasal floor for the INM and tipped up by 5° for the MNM. Successful passage of the two applicators gives a good hint of the subsequent ease or difficulty in anesthetizing and decongesting a meatus for endoscope insertion.

2.3. Nasal anesthesia

Although a pharyngeal reflex is inevitable, it can be reduced by adopting an upright position, drinking water, or breathing deeply; therefore, pharyngeal anesthesia is still recommended. In brief, we found that tolerability to UT-EGD is dependent on different techniques of nasal anesthesia in the following order: pledgetting > spray > cotton-tipped applicator methods [6].

2.3.1. Cotton-tippled applicator method (Shaker technique)

Cotton-tipped applicator nasal anesthesia (CTNA) was described by Shaker in 1994 [2]. With the patient in a sitting position, the more patent nostril is selected after the patient inhales through only one nostril with the other being sealed by the examiner's index finger. In patients with a narrow nasal vault, one 2-second puff of 0.05% epinephrine is applied to each of the anterior nares by an atomizer to enlarge the anterior nasal cavity. About 2 mL of 2% lidocaine gel is applied to the selected INM or MNM using a cotton-tippled applicator of a suitable size.

2.3.2. Three-step decongestive anesthesia (Miyawaki technique)

In 1998, Miyawaki (Izumo Central Clinic, Shimane, Japan) developed a three-step premedication method. This method includes the following procedures: (1) administration of 0.05% oxymetazoline to the anterior nares via an atomizer; (2) direct syringe injection of 4 mL liquid lidocaine (2%) into the patient-selected nostril (sniff test); and (3) insertion of, first, a thick, followed by a thin (6 mm and 4 mm diameters, respectively) 12-cm truncated distal end of a Foley catheter sprayed with 8% liquid lidocaine into the selected nasal meatus [5].

2.3.3. Anesthetic-free method (Barberani technique)

UT-EGD is very popular in Italy. Barberani et al [7] reported their UT-EGD experience in which no premedication was used for nasal anesthesia. In fact, comparative acoustic rhinometry has shown that the nasal minimal cross-sectional area is smaller in Asians than in whites and blacks [5]. Therefore, when examining Asian patients, endoscopists should be careful in the application and selection of an appropriate nasal anesthesia.

2.3.4. Lidocaine spray

The use of a spray prior to UT-EGD was first described in 2006 [8]. A high concentration of lidocaine not only causes a tingling sensation in the nose and eyes, but may also result in intoxication, with symptoms such as lightheadedness, dizziness, or even seizures. Use of an 8% or a 10% lidocaine spray is very common in most endoscopy rooms. Direct spray of 8% or 10% lidocaine is not only irritating, but may also induce complications. Lin et al [9] reported a case of possible lidocaine intoxication from 8% lidocaine sprays into the nasal cavity.

2.3.5. Endoscopic-guided nasal anesthesia

A strong grasp of nasal anesthetic skills is the key to a gastroenterologist's successful performance of a well-tolerated transnasal endoscopic procedure. Our group compared a novel endoscopic-guided nasal anesthesia with the conventional CTNA [5]. A spray (known as endoscopic-guided aerosolized spray) is used for the endoscopic-guided nasal anesthesia, which is better tolerated, causes less epistaxis, improves visualization capacity, and reduces procedure time compared to that in case of CTNA [5].

2.3.6. Cotton-tipped applicator primed gauze pledgetting

We later invented another method, cotton-tipped applicator primed gauze pledgetting, and compared it with endoscopic-guided aerosolized spray. The cotton-tipped applicator primed gauze pledgetting was found to be better tolerated and to elicit less unpleasant taste, fewer gagging episodes, and less throat pain after UT-EGD [6]. A detailed comparison of different nasal anesthetic techniques is given in Table 2 [2,5–7].

2.4. Patient position

Although the standard left lateral decubitus position is most commonly used, the upright sitting position is recommended to reduce the gag reflex. However, we found that remaining in an upright position is suboptimal for transnasal gastroscopy [10]. In case an endoscope is located in the antrum, the antrum is more extended when a patient shifts from the upright position to the left lateral decubitus position [11].

3. Feasibility

Successful transnasal insertion depends on the following factors: (1) age and gender; (2) size of the nasal meatus and tubinates; (3) scope size; (4) anesthetic method; and (5) endoscopic procedure. UT-EGD was found to exhibit a success rate of 88% in 33 volunteers [12]. Dumortier et al [13] reported that UT-EGD was performed in 1100 consecutive patients using a Fujinon transnasal scope (5.9 mm in diameter) and was preferred by them to other scopes with smaller diameters; they also reported significantly higher failure rates in women under 35 years.

Table 2
Comparison of commonly used unsedated transnasal endoscopic techniques and anesthetic methods.

Method	Shaker [2]	MiyawakI et al [5]	Barberani et al [7]	Hu [5,6]
Technique	Cotton-tipped applicator	Three-step procedures	Anesthesia free	Endoscopic guided [5] Gauze pledgetting [6]
Body position	Sitting	LLD	LLD	Individualized
Scopolamine injection	yes	Nil	Yes	Individualized
Pronase	Nil	Yes	Nil	Nil
Nasal decongestion	Bilateral (optional) 0.05% epinephrine	Bilateral 0.05% oxymet.	Nil	Single (optional) 0.05% epinephrine
Nasal anesthetics	2% Lido. jelly	4% Lido. liquid	Nil	2% Lido. spray [5] 4% Lido. liquid [6]
Oral spray	8–10% Lido.	Nil	Nil	8–10% Lido
Selected nasal meatus	Inferior or middle	Middle	Middle	Individualized
Anesthetic time (min)	3–6	20	Nil	1–2
Swallowing during insertion	Yes	Yes	Nil	Yes

Lido. = liquid lidocaine; LLD = left lateral decubitus; oxymet. = oxymetazoline.

4. Diagnostic performance on biopsy

As shown in Table 1, the working channel diameter of all transnasal endoscopes is 2 mm. The diameter of currently available biopsy forceps for transnasal endoscopes is 1.8 mm. Walter et al [14] reported a prospective study on 1335 specimens, showing that biopsy specimens obtained with small-caliber endoscopes had a diagnostic performance comparable with those obtained with conventional endoscopes. Unfortunately, the biopsy success rate with two-directional transnasal endoscopes was compromised by small gastric lesions, especially those in the posterior aspect of the cardia [15].

5. Accuracy

A small-caliber scope has certain advantages as well as disadvantages. Compared with the 2.8–3.2-mm channels (biopsy forceps is usually 2.3 mm in size) of a standard upper endoscope, the 2-mm channel of a transnasal endoscope limits suctioning and lens cleaning. Although the diagnostic accuracy of ultraslim endoscopy has been a clinical concern, unsedated UT-EGD was reported to be safe, well tolerated, and accurate in diagnosing hypopharyngeal cancer and screening esophageal lesions [16]. A few studies reported that, compared with sedated P-EGD, sedated and unsedated UT-EGD showed more than 96% diagnostic accuracy [17,18].

6. Tolerability

6.1. Acceptance of unsedated endoscope insertion

In eastern countries, P-EGD is usually performed without sedation. Unsedated P-EGD usually induces a gag reflex (also known as the pharyngeal reflex), nausea, and a choking sensation. The gag reflex involves a brisk elevation of the soft palate and bilateral contraction of the pharyngeal muscles. The transnasal route induces less stimulation to the tongue base, roof of the mouth, uvula and soft palate, palatine arches (palatoglossal and palatopharyngeal arches), and area around the tonsils than to the peroral route [19]. Conventional P-EGD without sedation causes “endoscophobia,” which may prevent one from undergoing the procedure repeatedly. By contrast, a patient can not only watch the procedure comfortably, but also talk with the endoscopist during transnasal endoscopy (Fig. 3). Several studies have shown fewer gagging episodes with a UT-EGD than with transoral small-caliber or conventional P-EGD [19,20]. In one study, more than 90% of the patients were willing to repeat UT-EGD [21], suggesting that UT-EGD is better tolerated than the conventional EGD [19,20].

6.2. Cardiovascular tolerance

Cardiovascular tolerance [22] and sympathetic stimulation [23] were assessed during UT-EGD. Although changes in peripheral blood oxygen saturation were minimal with either procedure, a significantly lower elevation of blood pressure and pulse rate was observed in patients undergoing UT-EGD than in those undergoing P-EGD [24].

6.3. Autonomic nervous system

Mori et al [23] performed a prospective randomized study in which the blood pressure and pulse rate, as well as autonomic nervous function, were evaluated during transnasal EGD and compared with those in oral procedures using the same ultrathin endoscope. They demonstrated a lower sympathetic stimulation in UT-EGD than in P-EGD, resulting in less elevation of blood pressure and pulse rate. However, both endoscopic procedures suppressed parasympathetic activity equally.

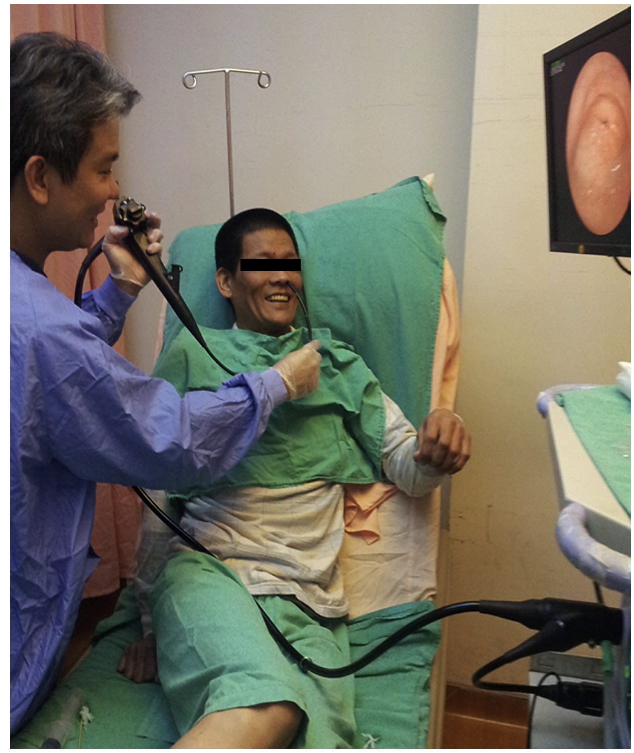

Fig. 3. A patient is watching his stomach and talking with the endoscopist (C.T. Hu) during transnasal endoscopy.

7. Safety

7.1. Fewer cardiovascular side effects

UT-EGD is safer and less stressful for patients than conventional P-EGD. It was found to be safer with fewer cardiovascular side effects than conventional P-EGD [19]. The major problem of conventional P-EGD is intravenous sedation. In one study, a significant increase in heart rate and a decrease in oxygen saturation were found to occur more frequently in conventional P-EGD than in UT-EGD [25]. The double product (heart rate × systolic blood pressure) was also increased significantly in the conventional P-EGD group compared with the UT-EGD group [25].

7.2. Less autonomic nervous stimulation

The autonomic nervous system is divided into the sympathetic nervous system and parasympathetic nervous system, which, according to a general rule of thumb, are categorized as "excitatory" and "inhibitory," respectively. UT-EGD has fewer side effects on cardiopulmonary function [22,25] and the autonomic nervous system than conventional P-EGD [23], because it requires minimal or no sedation. Fentanyl and propofol are the two drugs that are used commonly for intravenous sedation. Both reduce sympathetic tone to a greater extent than parasympathetic tone, thus decreasing blood pressure and heart rate, and predisposing patients to parasympathetic responses such as the vagovagal reflex.

7.3. Safety concerns in elderly and bedridden patients

Elderly and bedridden patients are prone to aspiration, pneumonia, and oxygen desaturation. P-EGD may stimulate salivary secretion, thus increasing the risk of the above mentioned adverse events. Yuki et al [26] found that the risk of aspiration pneumonia was much lower with UT-EGD than with P-EGD in elderly and bedridden patients. UT-EGD was reported to have less influence on oxygen saturation than P-EGD [25]. Similarly, UT-EGD was reported to be a safer method than P-EGD in aged hypertensive, critically ill, and bedridden patients who were undergoing percutaneous endoscopic gastrostomy feeding [26].

8. Cost effectiveness

Several reports found that UT-EGD requires a significantly shorter procedure and recovery time, with significantly lower costs for recovery rooms, personnel, intravenous access devices, and oxygen monitors, compared with P-EGD in sedated patients [4,27]. However, the development of UT-EGD has been very slow in some western countries. One of the reasons for this slow development is the potential impact of elimination of intravenous sedation charges from health insurance, which constitute a major source of income for endoscopists there.

9. Complications

9.1. Insertion injury to the nasal cavity

The major complication associated with UT-EGD is epistaxis, with reported rates between 0% and 22% [28]. In Japanese studies, the rates of epistaxis were reported to be in the range of 0–5% and all epistaxis was mild. However, most of these studies did not clarify the severity of epistaxis, because there are still no guidelines to grade nasal bleeding. Mori et al [24] proposed a three-grade scale for measuring the severity of epistaxis as a complication of transnasal endoscopy. Our group recommended a more solid, unambiguous proposal, suggesting that a thorough transnasal endoscopy report should include “how and where” bleeding was caused [29]. In our study, the following grading scheme was used: grade 1 (mucosal redness), grade 2 (confined hemorrhage inside the nasal cavity), and grade 3 (unconfined bleeding out of the nostril or into the hypopharynx).

9.2. Insertion injury outside the nasal cavity

Severe complications associated with UT-EGD included one case of proximal esophageal perforation [30]. The procedure was terminated in a 56-year-old woman with severe gagging, and she was discharged home. Subcutaneous emphysema was found after several hours, and a small proximal esophageal perforation was diagnosed. This case should remind endoscopists that during endoscopic insertion in the soft palate, uvula, hypopharynx, and the upper esophageal sphincter (cricopharyngeal muscle), severe gagging can elicit strong contraction; scope insertion should be gentle to avoid mucosal injury or even upper esophageal perforation.

9.3. Insertion difficulty

Endoscopists should avoid forced transnasal insertion through an extremely narrow nasal tract because it can cause severe nasal pain, nasomucosal injury, frank epistaxis, and withdrawal difficulty. When insertion into both nasal cavities is difficult, the same ultrathin scope can be inserted transorally with the aid of a smaller mouth piece.

9.4. Withdrawal difficulty

Tatsumi et al [31] reported difficult withdrawal of the scope in 0.12% of approximately 13,000 cases treated in 14 Japanese institutions. Prior to beginning UT-EGD, selecting the most patent meatus for insertion using a more reliable method (i.e., nasoendoscopy) than the subjective sniff test, and using the proper meatus and insertion angle (i.e., middle nasal meatus-scope perpendicular to the face) can help prevent this problem. When there is difficulty in withdrawing the scope, the following methods are recommended: (1) rotate the scope slightly; (2) resume the original insertion angle; (3) add extra 2% lidocaine gel to the scope shaft and insert the tip into the upper esophagus to lubricate the turbinates, nasal septum, and lateral wall; and (4) administer another bolus of decongestive anesthesia to shrink the nasal tract which might have re-narrowed after initial decongestion.

9.5. Early versus late nasal symptoms

Although several early complications such as epistaxis, sinusitis, transient lightheadedness, and mucous discharge have been reported by patients, still no studies have emphasized delayed side effects of the procedure. Our preliminary data showed that some patients complained of persistent nasal pain for more than 1 week. Very few patients had the abovementioned nasal complaints for more than several days. Some patients reported blood clots when blowing their nose for a few days to 1 week, suggesting insidious bleeding after the UT-EGD procedure. Endoscopists in western countries should note these late symptoms and complications, especially in Asian patients and those with a narrowed nasal cavity.

10. Therapeutic applications

The following indications have emerged for therapeutic UT-EGD: (1) nasoenteral feeding tube placement; (2) esophageal dilator placement; (3) positioning of pH and impedance catheters; (4) percutaneous endoscopic gastrostomy; (5) cholangioscopy and biliary drainage in septic patients; and (6) transnasal endoscopic retrograde cholangiopancreatography [32].

11. Other applications

11.1. Manometry

The use of small-caliber esophagoscopy makes possible simultaneous manometry and endoscopic observation of the esophagus. This combination has been proved to be useful in the evaluation of esophageal peristaltic function, such as in the diagnosis of gastroesophageal reflux disease [33].

11.2. Narrow band imaging

Olympus NBI improves visibility of the capillaries, veins, and other subtle tissue structures by placing narrow bandpass filters in front of a conventional white-light source. NBI uses two discrete bands of light: a blue light at 415 nm and a green light at 540 nm. Narrow-band blue light displays superficial capillary networks, whereas green light displays subepithelial veins. On the monitor, capillaries are displayed in brown and veins in cyan. A transnasal endoscope equipped with NBI and Lugol staining is useful for screening patients with head and neck cancer, especially those with difficulties (such as trismus) receiving P-EGD. The sensitivity of diagnosing esophageal lesions has increased with nonmagnified NBI UT-EGD [34].

11.3. *Flexible spectral imaging color enhancement*

Visible light consists of wavelengths from red to purple. Unlike NBI (which uses optical filters), Fujinon FICE focuses on a specific light spectra. A spectral image, the image captured by a wavelength, of a specific wavelength is amplified electrically and reconstructed to create a FICE image. FICE provides a comparison of spectral images of diseased and surrounding normal areas for enhancement of the contrast by combining wavelengths with greater differences in signals [35].

11.4. *iSCAN technology*

The Pentax iSCAN consists of three types of image enhancement: surface enhancement (enhancement of the structure through recognition of the edges), contrast enhancement (enhancement of depressed areas and differences in structure through colored presentation of low-density areas), and tone enhancement (enhancement tailored to individual organs through modification of the combination of the red/green/blue components for each pixel). NBI is usually much darker than conventional white-light images, but iSCAN images are as bright as conventional white-light images. Therefore, observation of much larger areas in a distant view is possible with iSCAN, compared with NBI.

12. Remaining problems

UT-EGD has been applied in various gastrointestinal therapeutic procedures such as esophageal manometry, nasoenteric feeding tube placement, percutaneous endoscopic gastrostomy, endoscopic retrograde cholangiopancreatography with nasobiliary drainage,

Buddhist Tzu Chi General Hospital

Department of Gastroenterology & Hepatology

Patient ID: **Age:** **Date:**

Patient name: **Gender:** **Referred by:**

Transnasal Endoscopy Report

Indication for endoscopy :

Epigastric pain off and on
for 3 weeks.

Procedure :

Patency test :

☐ Sniff test

☐ Plastic cotton-tipped applicator test

Method of pharyngeal anesthesia :

Two sprays of 10% liquid lidocaine

Method of nasal anesthesia :

☐ Local spray method

☐ Cotton-tipped applicator method

☐ Gauze pledegetting

☐ Japanese method

☐ 2% Lidocaine gel

Other medication :

☐ Dimethecon 100 mg (5 mL) plus 95 mL water P.O. before endoscopy

☐ Pronase 20,000 Units in 50 mL water P.O. before endoscopy

☐ Scopolamine 20 mg (1 mL) I.M. before endoscopy

Findings:

Nasal cavity : nasal septum deviation to the right. Scope insertion via the right middle nasal meatus.

Pharynx : normal

Larynx : reddish left arytenoid bulge

Esophagus : loose hiatus with several erosions above the EGJ; the erosive breaks over the lower esophagus are shorter than 5 mm in length.

Stomach : several elevated erosions over the antrum. A 5 mm healing ulcer in the angularis was biopsied and a tissue specimen for CLO test was obtained from the antrum.

Duodenum : normal to the second portion.

Complication : Grade 2 epistaxis from the right middle nasal concha. The bleeding stopped after using 1: 1000 epinephrine gauze packing for 2 min.

Endoscopic opinion :

1. Arytenoiditis
2. Reflux esophagitis, LA grade A

Advice :

1. Proton pump inhibitor
2. Suggest alcohol abstinence

Procedure done by : Dr. Chi-Tan Hu

Fig. 4. A sample transnasal endoscopy report. CLO = *Campylobacter*-like organism; GEJ = esophagogastric junction; I.M. = intramuscular injection; LA = Los Angeles classification; P.O. = per os (orally).

and long intestinal tube placement in small bowel obstruction. However, the following issues still remain: (1) there is still no consensus on issues of informed consent, nasal anesthesia, insertion, and exertion; (ii) indications and contraindications are not yet standardized [36]; and (3) hemoclipping for gastrointestinal bleeding and band ligation for varices ligation are not yet applicable. Above all, UT-EGD should not be regarded as a simple procedure. It involves much training for an endoscopist, including the one who has been trained well in P-EGD. We provide a sample transnasal endoscopy report in Fig. 4, which reveals clinical aspects and situations that should be considered and recorded by endoscopists.

In conclusion, transnasal endoscopy is an important milestone in gastrointestinal diagnostic and therapeutic endoscopy. Selection of the most patent meatus, methods of nasal anesthesia, and endoscope insertion/exertion techniques are learning issues for gastrointestinal endoscopists who want to become experienced in this procedure. UT-EGD is a useful supplement to conventional P-EGD in a variety of situations because it is well tolerated by patients.

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